

Equation Builder Help Sheet


GRADES 3 AND 4

The online M-STEP mathematics assessments include some items that provide an equation builder as a tool for constructing mathematical responses. If students have not encountered an equation builder before, they may need some modeling of the tool so they are prepared to use it appropriately.

To prepare students to use the equation builder, the Sample Item Sets in INSIGHT feature equation builders at every grade level. It is important to tell students that not all items need the equation builder, even though it may be provided in the response box. If a student only needs to enter numbers or a decimal, the answer can be entered in the response box using the keyboard. For these items, the equation builder is not needed.

An item that provides an equation builder will have a response box with a small “EQ” button at the upper left corner of the box. To access the equation builder, click the EQ button.

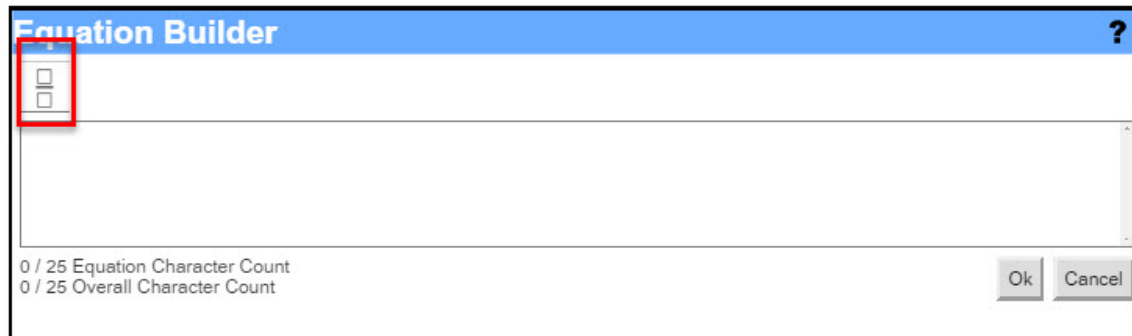
RESPONSE BOX



When a student clicks on the EQ button, the equation builder will open.

For instructions on how to enter a fraction in the equation builder, please see below.

Fraction builder tool: In this tool, a student may construct a fraction by clicking first on the fraction symbol shown here . . .



And then by clicking on the numerator box in the fraction and typing their numeric response here . . .



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And finally by clicking on the denominator box and typing the numeric response the fraction is complete. (*Hint: The arrow keys may also be used to toggle between the numerator and denominator.*)



The dialog box is titled "Equation Builder" with a question mark icon in the top right corner. It contains a large text input field where the fraction $\frac{3}{4}$ has been entered. The denominator "4" is currently selected with a blue highlight. Below the input field, there is a character count: "1 / 24 Equation Character Count" and "2 / 25 Overall Character Count". At the bottom right, there are "Ok" and "Cancel" buttons.

When the student is finished using the equation builder tool, he or she will click OK and the answer will appear in the response box.



The response box shows a tab labeled "EQ" at the top. Below the tab, the fraction $\frac{3}{4}$ is displayed in a large font.

NOTE: The appearance of the EQ button does not mean the answer is a fraction. It is provided as a tool that the student MAY use to answer the question, thus assessing the student's conceptual understanding of the item.

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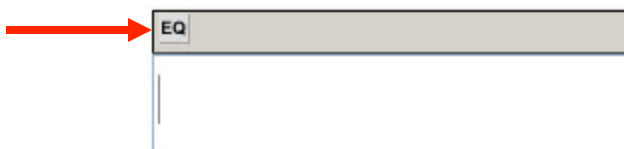
GRADES 5 AND 6

The online M-STEP mathematics assessments include some items that provide an equation builder as a tool for constructing numeric responses. If students have not encountered an equation builder before, they may need some modeling of the tool so they are prepared to use it appropriately.

To prepare students to use the equation builder, the Sample Item Sets in INSIGHT feature equation builders at every grade level. It is important to tell students that not all items need the equation builder, even though it may be provided in the response box. If a student only needs to enter numbers or a decimal, the answer can be entered in the response box using the keyboard. For these items, the equation builder is not needed.

An item that provides an equation builder will have a response box with a small “EQ” button at the upper left corner of the box. To access the equation builder, click the EQ button

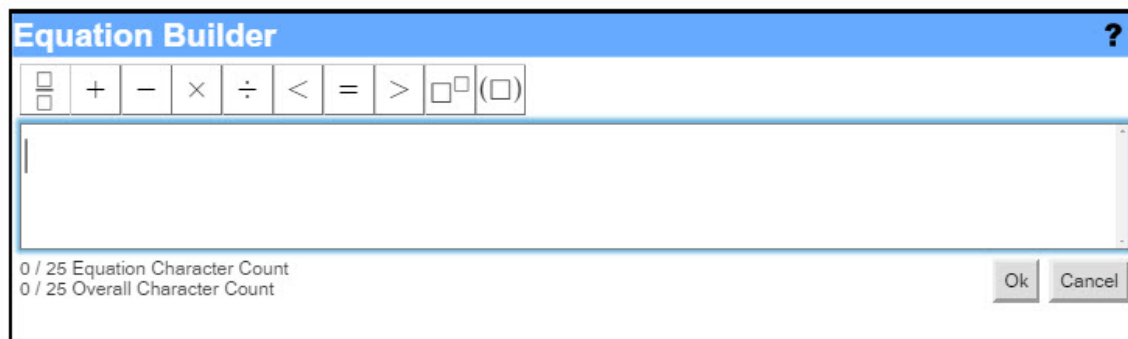
RESPONSE BOX



As in grades 3 and 4, 5th and 6th grade items will also have an equation builder, however, it will have more tools for students to use to create their responses to the item. This tutorial will explain how to use some of these tools.

In addition to the fraction tool, the 5th and 6th grades equation builders have all operands, “greater than” and “less than” symbols, exponent symbols, and parenthetical phrase symbols.

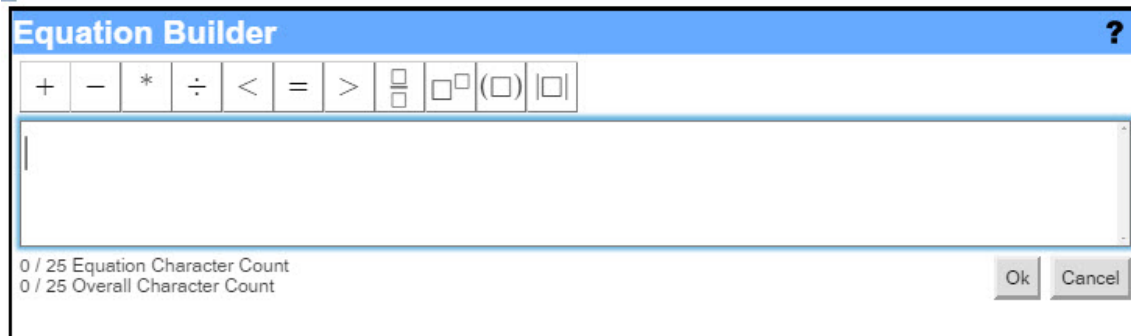
5th GRADE EQUATION BUILDER



The 6th grade equation builder has all of the above symbols, plus an “absolute value” symbol.

Equation Builder Help Sheet

6th GRADE EQUATION BUILDER



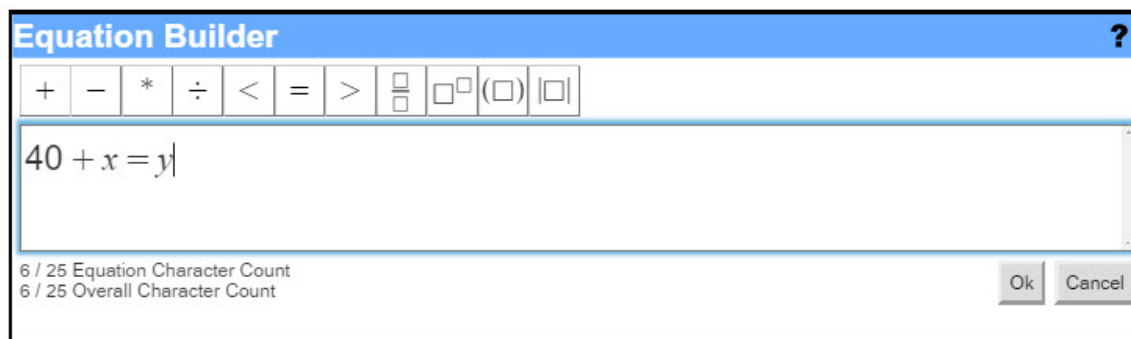
Equation Builder ?

$+$ $-$ $*$ \div $<$ $=$ $>$ $\frac{\square}{\square}$ \square^\square (\square) $|\square|$

0 / 25 Equation Character Count
0 / 25 Overall Character Count

Ok Cancel

To write an equation or expression, simply type the mathematical values in the equation builder, using the operand symbols. (Hint: Use the keyboard for the mathematical values, but it is best to use the mouse to click on the symbols in the equation builder.)



Equation Builder ?

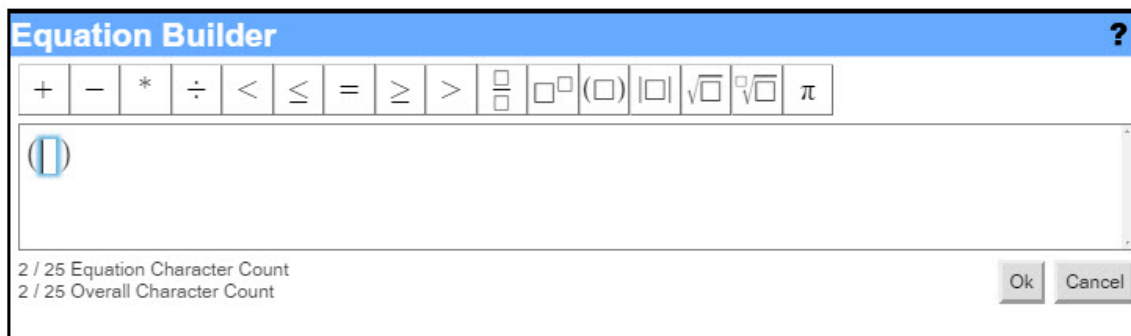
$+$ $-$ $*$ \div $<$ $=$ $>$ $\frac{\square}{\square}$ \square^\square (\square) $|\square|$

40 + x = y

6 / 25 Equation Character Count
6 / 25 Overall Character Count

Ok Cancel

The use of the parentheses symbol is similar. When the student clicks on the parentheses symbol, they will see this, with the blinking cursor . . .



Equation Builder ?

$+$ $-$ $*$ \div $<$ \leq $=$ \geq $>$ $\frac{\square}{\square}$ \square^\square (\square) $|\square|$ $\sqrt{\square}$ $\sqrt[n]{\square}$ π

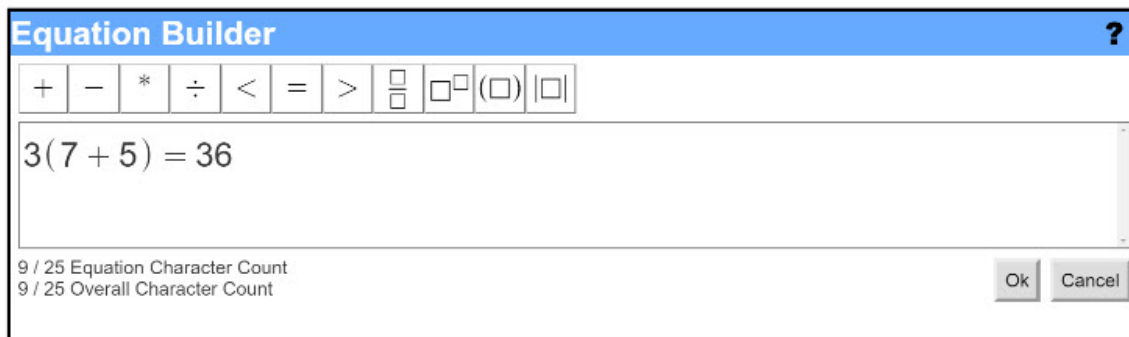
()

2 / 25 Equation Character Count
2 / 25 Overall Character Count

Ok Cancel

And then enter the mathematical values . . .

Equation Builder Help Sheet



Equation Builder ?

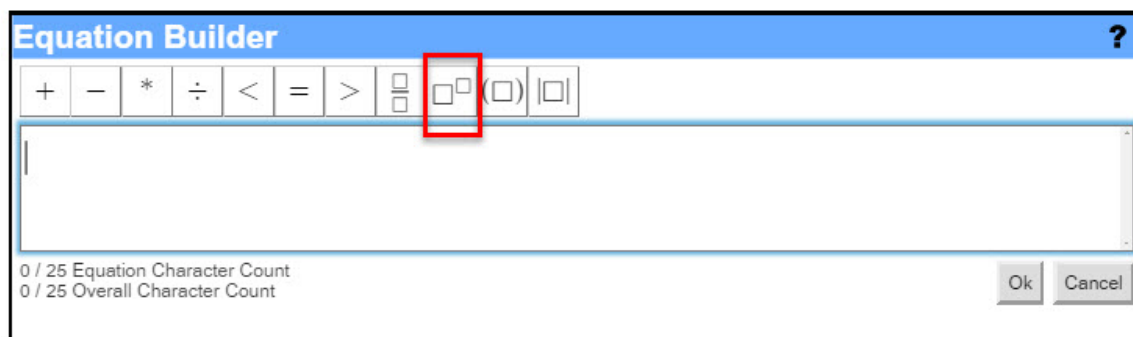
$+$ $-$ $*$ \div $<$ $=$ $>$ $\frac{\square}{\square}$ \square^\square (\square) $|\square|$

$3(7 + 5) = 36$

9 / 25 Equation Character Count
9 / 25 Overall Character Count

Ok Cancel

To use the exponent symbol, click on the symbol in the tool bar . . .



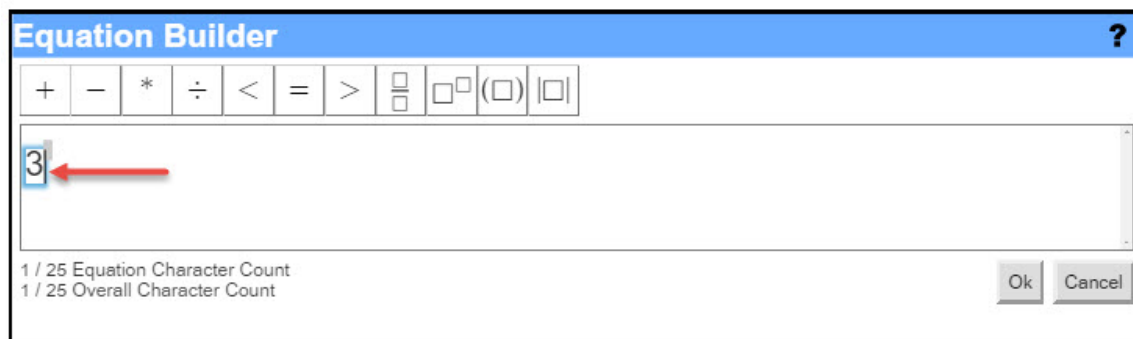
Equation Builder ?

$+$ $-$ $*$ \div $<$ $=$ $>$ $\frac{\square}{\square}$ \square^\square (\square) $|\square|$

0 / 25 Equation Character Count
0 / 25 Overall Character Count

Ok Cancel

Then, click in the number box on the right to enter the first numeric value . . .



Equation Builder ?

$+$ $-$ $*$ \div $<$ $=$ $>$ $\frac{\square}{\square}$ \square^\square (\square) $|\square|$

3

1 / 25 Equation Character Count
1 / 25 Overall Character Count

Ok Cancel

Equation Builder Help Sheet

Next, click in the **exponent box** and enter the numeric value . . .



Equation Builder ?

$+$ $-$ $*$ \div $<$ $=$ $>$ $\frac{\square}{\square}$ \square^\square (\square) $|\square|$

3

1 / 25 Equation Character Count
1 / 25 Overall Character Count

Ok Cancel



Equation Builder ?

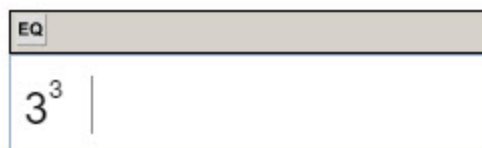
$+$ $-$ $*$ \div $<$ $=$ $>$ $\frac{\square}{\square}$ \square^\square (\square) $|\square|$

3³

2 / 25 Equation Character Count
2 / 25 Overall Character Count

Ok Cancel

Finally, click Ok and the answer will appear in the response box.



EQ

3³ |

NOTE: The appearance of the EQ button does not mean the answer requires the use of the equation builder. It is provided as a tool that the student MAY use to answer the question, thus assessing the student's conceptual understanding of the item.

Equation Builder Help Sheet

GRADES 7 AND 8

The online M-STEP mathematics assessments include some items that provide an equation builder as a tool for constructing numeric responses. If students have not encountered an equation builder before, they may need some modeling of the tool so they are prepared to use it appropriately.

To prepare students to use the equation builder, the Sample Item Sets in INSIGHT feature equation builders at every grade level. It is important to tell students that not all items need the equation builder, even though it may be provided in the response box. If a student only needs to enter numbers or a decimal, the answer can be entered in the response box using the keyboard. For these items, the equation builder is not needed.

An item that provides an equation builder will have a response box with a small “EQ” button at the upper left corner of the box. To access the equation builder, click the EQ button

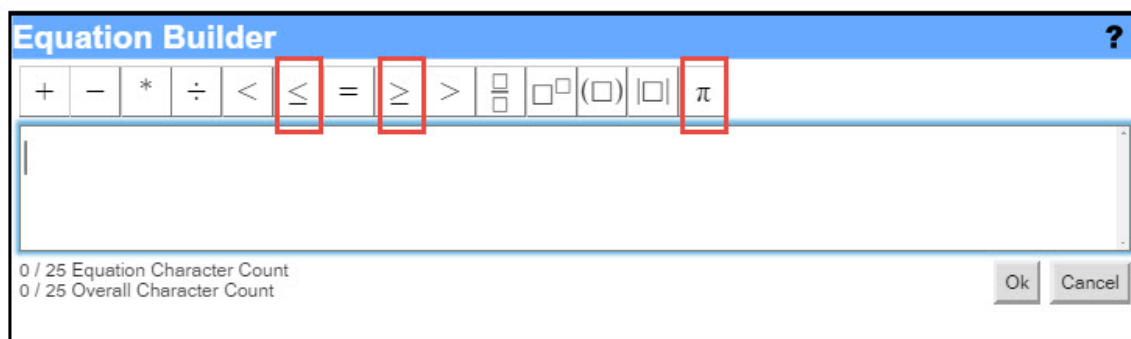
RESPONSE BOX



Grades 7 and 8 will include all tools provided in grades 3–6, however, it will have more tools for students to use to create their responses to the item. This tutorial will explain how to use some of these tools.

Grade 7 will include all of the previous tools and will also include the “greater than or equal to” symbol, the “less than or equal to” symbol and the π symbol.

7th GRADE EQUATION BUILDER



Grade 8 will include all of the previous symbols and will also include the square root symbols.

Equation Builder Help Sheet

8th GRADE EQUATION BUILDER

Equation Builder

+

-

*

÷

<

≤

=

≥

>

$\frac{\square}{\square}$

\square^\square

(\square)

\square

$\sqrt{\square}$

$\sqrt[n]{\square}$

π

0 / 25 Equation Character Count

0 / 25 Overall Character Count

Ok

Cancel

To use these tools, student will click on the symbol(s) in the equation builder toolbar, and then enter the appropriate mathematical responses.

Equation Builder

+

-

*

÷

<

≤

=

≥

>

$\frac{\square}{\square}$

\square^\square

(\square)

\square

$\sqrt{\square}$

$\sqrt[n]{\square}$

π

12 ≥ 5 + 7

6 / 18 Equation Character Count

13 / 25 Overall Character Count

Ok

Cancel

Equation Builder

+

-

*

÷

<

≤

=

≥

>

$\frac{\square}{\square}$

\square^\square

(\square)

\square

$\sqrt{\square}$

$\sqrt[n]{\square}$

π

$\sqrt[n]{16}$

3 / 25 Equation Character Count

3 / 25 Overall Character Count

Ok

Cancel

Equation Builder

+

-

*

÷

<

≤

=

≥

>

$\frac{\square}{\square}$

\square^\square

(\square)

\square

$\sqrt{\square}$

$\sqrt[n]{\square}$

π

$\pi = \frac{c}{d}$

3 / 25 Equation Character Count

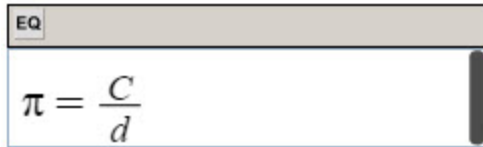
3 / 25 Overall Character Count

Ok

Cancel

Equation Builder Help Sheet

Once the student clicks “Ok,” the answer will appear in the response box.



A screenshot of the Equation Builder interface. It features a light gray header bar with the text "EQ" in a small box on the left. Below the header is a large white text area containing the mathematical equation $\pi = \frac{C}{d}$. A vertical scrollbar is visible on the right side of the text area.

NOTE: The appearance of the EQ button does not mean the answer requires the use of the equation builder. It is provided as a tool that the student MAY use to answer the question, thus assessing the student’s conceptual understanding of the item.

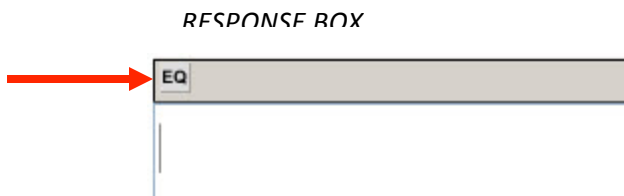
Equation Builder Help Sheet

GRADE 11

The online M-STEP mathematics assessments include some items that provide an equation builder as a tool for constructing numeric responses. If students have not encountered an equation builder before, they may need some modeling of the tool so they are prepared to use it appropriately.

To prepare students to use the equation builder, the Sample Item Sets in INSIGHT feature equation builders at every grade level. It is important to tell students that not all items need the equation builder, even though it may be provided in the response box. If a student only needs to enter numbers or a decimal, the answer can be entered in the response box using the keyboard. For these items, the equation builder is not needed.

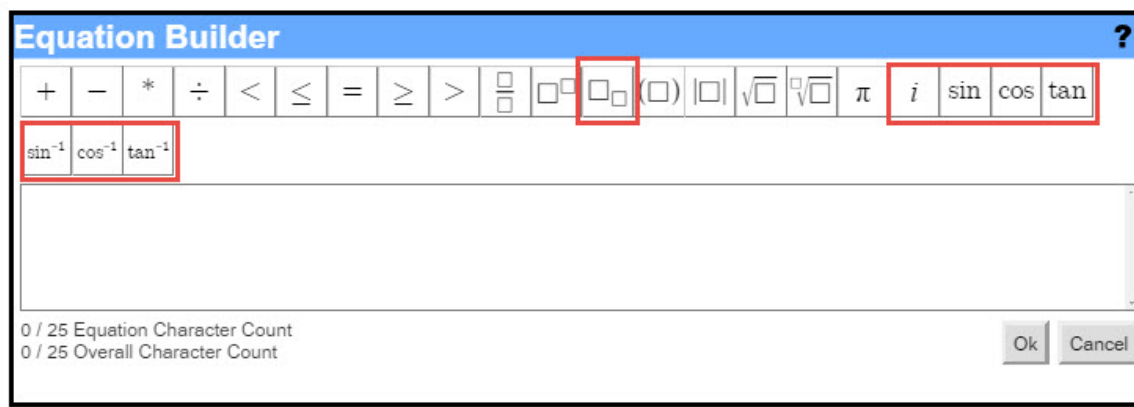
An item that provides an equation builder will have a response box with a small “EQ” button at the upper left corner of the box. To access the equation builder, click the EQ button



Grade 11 will include all tools provided in grades 3–8, however, it will have more tools for students to use to create their responses to the item. This tutorial will explain how to use some of these tools.

Grade 11 will include all of the previous tools and will also include the tools indicated in the red boxes below:

11th GRADE EQUATION BUILDER



As before, as the student selects the appropriate tool, the tool will appear in the equation builder and then the student will enter the desired mathematical value. For example:

Equation Builder Help Sheet

Equation Builder

+

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=

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>

$\frac{\Box}{\Box}$

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\Box_\Box

(\Box)

| \Box |

$\sqrt{\Box}$

$\sqrt[\Box]{\Box}$

π

i

sin

cos

tan

\sin^{-1}

\cos^{-1}

\tan^{-1}

$\sin^{-1}(\Box)$

7 / 25 Equation Character Count

7 / 25 Overall Character Count

Ok

Cancel

Equation Builder

+

−

*

÷

<

≤

=

≥

>

$\frac{\Box}{\Box}$

\Box^\Box

\Box_\Box

(\Box)

| \Box |

$\sqrt{\Box}$

$\sqrt[\Box]{\Box}$

π

i

sin

cos

tan

\sin^{-1}

\cos^{-1}

\tan^{-1}

$\sin^{-1}\left(\frac{1}{2}\right)$

8 / 25 Equation Character Count

8 / 25 Overall Character Count

Ok

Cancel

Once the student clicks “Ok,” the answer will appear in the response box.

EQ

$\sin^{-1}\left(\frac{1}{2}\right)$

NOTE: The appearance of the EQ button does not mean the answer requires the use of the equation builder. It is provided as a tool that the student MAY use to answer the question, thus assessing the student’s conceptual understanding of the item.